

**STRUCTURAL BREAKS AND REAL CONVERGENCE IN OPEC
COUNTRIES**

JUNCAL CUÑADO

FUNDACIÓN DE LAS CAJAS DE AHORROS
DOCUMENTO DE TRABAJO
Nº 521/2010

De conformidad con la base quinta de la convocatoria del Programa de Estímulo a la Investigación, este trabajo ha sido sometido a evaluación externa anónima de especialistas cualificados a fin de contrastar su nivel técnico.

ISSN: 1988-8767

La serie **DOCUMENTOS DE TRABAJO** incluye avances y resultados de investigaciones dentro de los programas de la Fundación de las Cajas de Ahorros.
Las opiniones son responsabilidad de los autores.

STRUCTURAL BREAKS AND REAL CONVERGENCE IN OPEC COUNTRIES

Juncal Cuñado*

Abstract

This article examines real convergence hypothesis in OPEC countries (Algeria, Angola, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela) by means of using time series techniques and allowing for structural breaks. The results show the existence of structural breaks in the convergence process, most of them occurring around 1979-81, which suggests that this convergence process is related to the evolution of the oil price. Furthermore, when applying unit root tests allowing for structural breaks, we only find evidence of catch-up towards the U.S. economy for the case of Indonesia, and for Angola in the last years of the sample. When we define alternative reference economies, we also find evidence of conditional convergence with structural breaks, but only for Nigeria within Africa and for Kuwait relative to countries in West-Asia.

Keywords: Real convergence; Unit root tests; OPEC countries; Structural breaks.

JEL classification: C32; O41.

***Corresponding author:** Juncal Cuñado, Faculty of Economics and Business, Universidad de Navarra, Pamplona (31080), Spain. E-mail: jcunado@unav.es

Acknowledgements: The author gratefully acknowledges financial support from Government of Spain and grand number ECO2008-03035. She also thanks the participants at the XI Conference on International Economics (Barcelona, 2009) for helpful comments and suggestions.

1. Introduction

There has been in recent years an emerging body of empirical literature on convergence in per capita output across different economies. The interest on this subject may be explained, at least in part, as a prediction test of the neoclassical growth model (Solow, 1956) as opposed to the “new” endogenous growth models (see, for example, Romer, 1986 and Lucas, 1988). As it is well known, the neoclassical model predicts (under some assumptions) that per capita output will converge to each country’s steady-state (conditional convergence) or to a common steady-state (unconditional convergence), regardless of its initial per capita output level. On the contrary, in endogenous growth models there is no tendency for income levels to converge, since divergence can be generated by relaxing some of the neoclassical assumptions (e.g., incorporating non convexities in the production function).

Furthermore, the great differences observed in per capita output and in growth rates across countries justify a deeper study on convergence. However, among the great number of empirical papers which studies convergence, no attention has been paid to the OPEC experience. The Organization of Petroleum Exporting Countries (OPEC) is currently a cartel of 12 countries made of Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela¹. OPEC nations still account for two-thirds of the world's oil reserves, and, as of March 2008, 35.6% of the world's oil production, affording them considerable control over the global oil market.

Until World War II, economic literature believed that natural resources were an important factor affecting economic growth, while recent evidence has found that countries rich in natural resources grow slower on average than natural

resource poor countries (see, for example, Sala-i-Martin, 1997; Sachs and Warner, 1999, 2001 and Mehlum *et al.*, 2006 among others). This article examines the real convergence hypothesis in 14 OPEC countries during the second half of the twentieth century. Although all the analyzed countries are rich in natural resources, oil, there are great differences among them: first, from the 14 countries belonging to the OPEC, seven are situated in the Middle East, five in Africa and two in South America; second, there are great differences in the year they joined the OPEC organization, and the size of the country; third, there are also great differences in the quotas of each of the countries (for example, while Saudi Arabia produces 10,000 thousands of barrels of oil per day, Ecuador only produces 500).

TABLE 1. Average growth rates, different periods

Average growth rates of per capita GDP series				
	1950-2006	1950-1970	1971-1990	1991-2006
Algeria	0.017	0.025	0.014	0.010
Angola	0.004	0.026	-0.036	0.025
Libya	0.020	0.118	-0.054	-0.009
Gabon	0.003	0.032	-0.010	0.015
Nigeria	0.011	0.019	0.001	0.015
Ecuador	0.012	0.021	0.016	-0.002
Venezuela	0.004	0.018	-0.012	0.009
Indonesia	0.029	0.018	0.037	0.032
Iran	0.023	0.044	-0.009	0.035
Iraq	0.001	0.047	-0.017	-0.034
Kuwait	-0.015	0.003	-0.080	0.044
Qatar	-0.016	0.004	-0.079	0.037
Saudi Arabia	0.025	0.061	0.008	-0.001
United Arab Emirates	-0.003	0.022	-0.032	-0.001
Total Africa	0.011	0.020	0.003	0.010
Latin America (15)	0.015	0.020	0.011	0.013
East Asia (16)	0.037	0.038	0.032	0.041
West Asia (15)	0.023	0.040	0.009	0.019
U.S.	0.021	0.023	0.022	0.018

The evolution of oil prices in the last fifty years has been subject to many changes: after the 1973 and 1979 oil crisis, oil prices experienced an increase until

¹ In this paper, two former OPEC members are included, Gabon and Indonesia. Indonesia's membership from OPEC was voluntarily suspended in 2008 as it became a net importer of oil. Gabon left the OPEC organization in 1994.

mid-80's, and then they started to decrease. As shown in Table 1, average growth rates of analyzed countries seem to be related to the evolution of oil prices. However, there has been substantial diversity across countries (see Table 1). As shown in this table, while the average growth rate of per capita GDP series were negative for many OPEC countries during the period 1971-1990, the average growth rate for Indonesia was 3.7% and 1.6% and 1.4% for Ecuador and Algeria. However, average growth rates are higher for the last period of the sample (2.6% average growth rate for Angola, 3.2 for Indonesia, 3.4% for Iran and Qatar, etc.).

The differential behaviour of the growth rates of these countries, their difficulties to converge to real per capita GDP levels of developed countries and the little research found in the literature regarding this group of countries motivates the analysis on real convergence made in this paper. In this paper we define real convergence towards two different reference economies: first, and as a global reference, we examine the real convergence hypothesis towards the U.S. economy; second, we also define alternative regional references, so that, depending on the continent of each of the analyzed countries, we use as references, the per capita GDP average of the region (Africa, Latin America, East Asia and West Asia).

Empirical testing of the convergence hypothesis provides several definitions of convergence and thus, different methodologies to test it. In a cross-section approach, a negative (partial) correlation between growth rates and initial income is interpreted as evidence of unconditional (conditional) beta-convergence. In this framework, one of the most generally accepted results is that while there is no evidence of unconditional convergence among a broad sample of countries, the conditional convergence hypothesis holds when examining more homogenous groups of countries (or regions) or when conditioning on additional explanatory variables. Examples in this context are Baumol (1986), De Long (1988), Dowrick

and Nguyen (1989), Grier and Tullock (1989), Barro (1991), Barro and Sala-i-Martin (1991, 1992, 1995), Mankiw *et al.* (1992), etc..

In a time series approach, stochastic convergence asks whether permanent movements in one country's per capita output are associated with permanent movements in another countries' output, that is, it examines, whether common stochastic elements matter, and how much persistent the differences among countries are. Thus, stochastic convergence implies that output differences among economies cannot contain unit roots. Empirical tests on this hypothesis have been carried out by Campbell and Mankiw (1989), Cogley (1990), Bernard (1991), Carlino and Mills (1993), Bernard and Durlauf (1995), Cuñado *et al.* (2003), Beliu and Higgins (2004), and, in general, they do not find evidence of convergence.

However, when the convergence tests take into account the possibility of structural breaks, the evidence of convergence is reinforced. Greasley and Oxley (1997) found evidence of bivariate convergence between Belgium and Netherlands, France and Italy, Australia and the U.K., and Sweden and Denmark. St. Aubyn (1999) finds evidence of convergence between U.S. and each of the U.K., Australia and Japan, using the Kalman filter methodology. Cellini and Scorcio (2000) detect stochastic convergence only for the U.S. and Canada, and the U.S. and the U.K. when they allow for structural breaks. Strazicich *et al.* (2003) examine the differences in per capita incomes of fifteen OECD countries with the U.S. economy over the period 1870-1994 allowing for two structural breaks and they reject the unit root null hypothesis in eleven of the fifteen countries, thus supporting the stochastic convergence hypothesis.

In this paper, we apply time series convergence tests allowing for structural breaks to the differences in per capita output for 14 OPEC countries using data for the period 1950-2006. The outline of the paper is as follows. Section 2 describes

the methodology employed in the article to test for convergence. Section 3 covers the empirical analysis and Section 4 offers some conclusions.

2. Time Series Convergence Tests

In a time series testing framework, countries i and j convergence if their outputs are cointegrated with cointegrating vector $[1,-1]$, that is, the difference $y_{i,t+k} - y_{j,t+k}$ must be a stationary $I(0)$ process with no deterministic components (unconditional convergence), where y_i is the log real GDP per capita in country i and likewise y_j for country j .

Since most of the procedures for testing the unit root hypothesis include the cases of no regressors, an intercept, and an intercept and a linear trend, we can distinguish between long-run convergence (unconditional or conditional² depending on the significance of the intercept, α_0 in equation (1)) and convergence as a catch-up (if the log of relative output is trend stationary, $\alpha_1 > 0$ in equation (1)). Although this last definition³ may be open to criticism because the presence of a time trend allows for permanent per capita output differences, it might be appropriate in a context in which convergence is an on-going process (see Bernard and Durlauf, 1995 and Oxley and Greasley, 1995), as the one observed for less developed countries, such as some of the OPEC countries analyzed in this paper. In this context, we will test for convergence analyzing the integration order of the relative incomes using the following equation:

$$\Delta RI_t = \alpha_0 + \alpha_1 t + \beta RI_{t-1} + \sum_{j=1}^p c_j \Delta RI_{t-j} + e_t, \quad (1)$$

² According to neoclassical models, unconditional or absolute convergence holds when per capita GDP of the different countries convergence to the same steady state. In contrast, conditional convergence applies when per capita GDP of each economy converge to its own steady state. In this last case, the constant α_0 measures the differences in the steady state of each of the economies.

³ Carlino and Mills (1993), for example, use this methodology in order to allow initially low income countries to grow faster than higher income countries.

where $RI_t = \ln(y_t^{US}) - \ln(y_t^i)$, the p extra regressors, $\square RI_{t-j}$ are added to eliminate possible serial correlation in the error terms.

However, these types of unit root tests may fail to recognise convergence when structural breaks are present. For example, St. Aubyn (1999), Cellini and Scorcu (2000) show that the introduction of structural breaks makes the existence of convergence across countries more clear.

For the OPEC economies, we could think in the existence of one or more breaks in the convergence process during the period 1950-2006. As Perron (1989) pointed out, these tests perform poorly when there is a break in the constant or deterministic trend function. However, Perron's method has been criticized on the grounds that the break point is chosen exogenously. Several authors, such as Christiano (1992), Perron and Vogelsang (1992) or Zivot and Andrews (1992) have developed methods to endogenously search for a break point and test for the presence of a unit root when the process has a broken constant or trend and have demonstrated that their test are robust and more powerful than the Augmented Dickey-Fuller (ADF, Dickey-Fuller, 1979) and Phillips-Perron (1988) tests⁴. However, these last procedures have also been criticized in the literature (see, for example, Nunes *et al.*, 1997 and Lee and Strazicich, 2001, 2003 among others), since these type of tests derive their critical values assuming no breaks under the null, so that, in the presence of a unit root with break, these tests will tend to reject the null hypothesis suggesting that the time series is stationary around a break when it is nonstationary with a break. In order to solve this problem, we will use the endogenous two-break⁵ LM unit root test proposed by Lee and Strazicich (2003) which is unaffected by breaks under the null⁶.

⁴ Recent empirical application of these tests can be found in Leybourne and Newbold (2003), Atkins and Chan (2004), Sen (2004) or Narayan (2005a,b), among others.

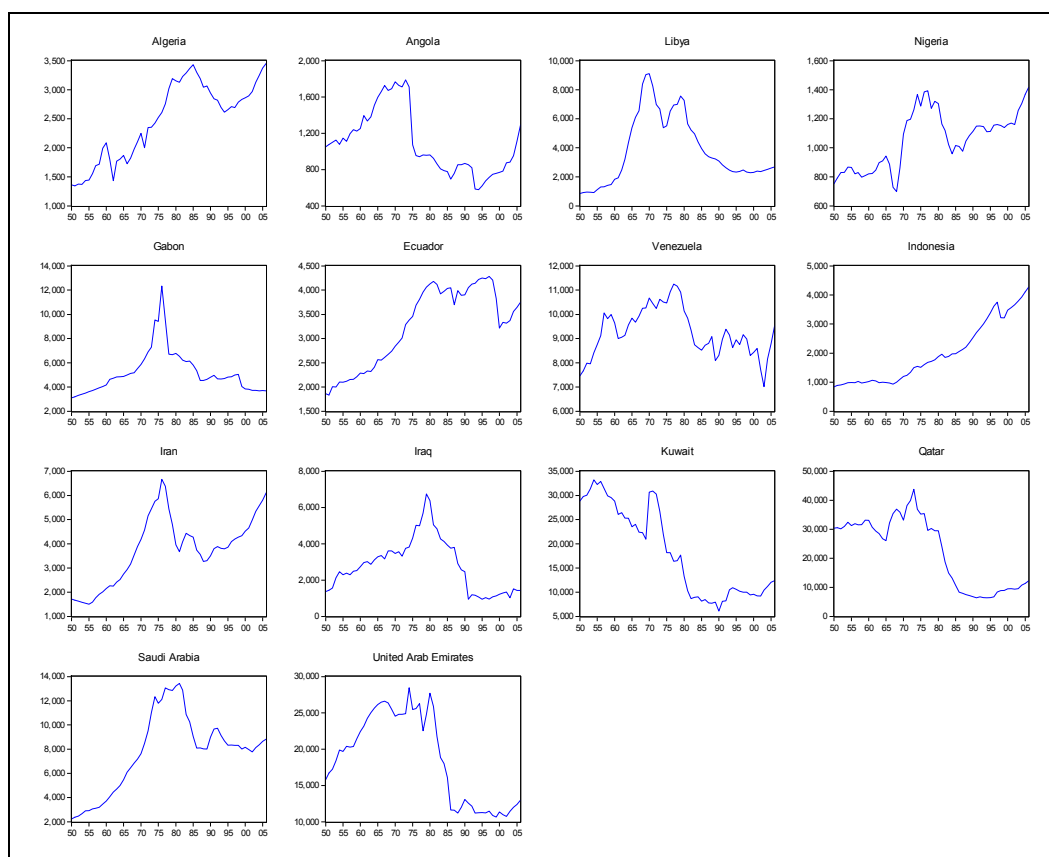
⁵ We use this two-break LM unit root test and not the one-break LM test because an examination of the empirical results reveals that the two structural breaks included in the model were significant in all the analyzed countries for the period 1950-2003.

⁶ See Lee and Strazicich (2003) for a more detailed description of the test. The computation of the LM unit root test statistic has been carried out using the Gauss codes provided by Junsoo Lee and available on the web site <http://www.cba.ua.edu/~jlee/gauss>.

3. Empirical Analysis

The data used in this section are annual log real GDP per capita in 1990 Geary-Khamis PPP-adjusted dollars. The series runs from 1950 to 2006 for 14 OPEC countries (Algeria, Angola, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela). As reference economies, we use per capita GDP in the U.S., and an average of per capita GDP in Africa, Latin America, East Asia and West Asia. All the variables have been obtained from Maddison (2001). The temporal evolution of the variables are shown in Figure 1.

FIGURE 1. Real per capita GDP (in logs), 1950-2006



First, we carry out ADF unit root tests to each of the series in order to obtain the integration order of each of the series (see Table 2). As convergence measure,

we define the differences of each of the log real per capita GDP series with respect to the U.S. and to the alternative regional references.

TABLE 2. ADF unit root tests

Testing the integration order of the log real per capita GDP series			
	With no regressors	With an intercept	With an intercept and a linear time trend
Algeria	1.81	-0.89	-1.52
Angola	0.03	-1.43	-1.18
Ecuador	3.14	-0.47	-1.42
Gabon	-0.46	-1.76	-1.70
Indonesia	5.04	2.31	-0.85
Iran	0.54	-1.41	-2.16
Iraq	-0.47	-1.09	-1.60
Kuwait	-1.49	-1.12	-1.30
Libya	-0.77	-1.91	-1.92
Nigeria	0.95	-0.81	-1.80
Qatar	-1.18	-0.71	-1.22
Saudi Arabia	0.04	-1.87	-1.59
United Arab Emirates	-0.4	-0.79	-2.15
Venezuela	0.62	-2.47	-2.61
Africa	2.04	-0.78	-1.52
Latin America	2.45	-0.18	-1.67
East Asia	4.36	3.98	2.30
West Asia	1.24	-0.95	-2.01
U.S.	8.31	1.83	-2.35

The 10%, 5% and 1% critical values are: model with no regressors: -1.61, -1.95, -2.61; model with an intercept: -2.60, -2.92, -3.57; model with an intercept and a linear time trend: -3.18, -3.50, -4.16. In any of the cases, we can reject the null hypothesis of unit root. When ADF unit root tests are applied to the first differences of the logs of these variables (growth rates of per capita GDPs), the unit root null hypothesis is rejected in all the cases. Therefore, per capita GDP are considered I(1) series.

The results from the ADF tests to the differences of each of per capita GDP series with respect to the U.S. and the regional references are reported in Table 3. We are unable to reject the unit root hypothesis in favor of unconditional convergence for any of the OPEC countries towards the U.S. economy. When we include an intercept and a time trend in the model, we are also unable to reject the unit root hypothesis in favor of conditional convergence or catch-up towards this economy. However, when we analyze convergence towards alternative reference economies, we find evidence of conditional convergence of Nigeria towards the African average.

TABLE 3. ADF unit root tests on per capita GDP differences

	With no regressors	With an intercept	With an intercept and a linear time trend	Converging?
Differences of log real per capita GDP series with the U.S.				
Algeria	0.32	-1.39	-1.96	U
Angola	0.32	-1.19	-1.07	U
Ecuador	0.70	-0.85	-1.63	U
Gabon	1.39	0.32	-1.49	U
Indonesia	-1.00	-0.75	-2.40	U
Iran	-0.68	-2.08	-2.13	U
Iraq	0.70	-0.26	-2.04	U
Kuwait	-0.77	-1.07	-0.86	U
Libya	-0.41	-1.22	-1.91	U
Nigeria	0.13	-1.86	-2.53	U
Qatar	-0.99	-0.95	-1.20	U
Saudi Arabia	-0.78	-1.67	-1.74	U
United Arab Emirates	-0.34	0.04	-2.18	U
Venezuela	1.59	-0.38	-3.01	U
Differences of log real per capita GDP series with Africa				
Algeria	0.84	-1.10	-1.73	U
Angola	-0.97	-1.27	-1.59	U
Gabon	-0.75	-0.41	-1.37	U
Libya	-1.10	-1.84	-1.93	U
Nigeria	-0.88	-2.94**	-2.98	C
Differences of log real per capita GDP series with Latin America				
Ecuador	1.61	0.03	-1.81	U
Venezuela	-0.89	-0.61	-2.92	U
Differences of log real per capita GDP with East Asia				
Indonesia	1.29	0.62	-0.44	U
Differences of log real per capita GDP series with West Asia				
Iran	-1.56	-2.30	-2.37	U
Iraq	1.17	0.33	-1.87	U
Kuwait	-1.79*	-1.07	-1.31	D
Qatar	-1.43	-0.57	-1.38	U
Saudi Arabia	-0.65	-1.77	-1.44	U
United Arab Emirates	-0.77	-0.36	-2.32	U

The critical values are: Model with no regressors: -1.61, -1.95, -2.61. Model with an intercept: -2.60, -2.92, -3.57. Model with an intercept and a linear time trend: -3.18, -3.50, -4.16. *, ** and *** indicate significant at the 10%, 5% and 1% levels respectively. C denotes catch-up, D denotes divergence, and U denotes unit root.

The little evidence of convergence or catch-up among this group of countries could be due to the existence of different convergence speeds in the convergence process or the case in which countries pass through convergence to nonconvergence processes (or viceversa), two possibilities which will be studied

while allowing for structural breaks when applying the minimum Lagrange Multiplier statistic suggested by Lee and Strazicich (2003).

TABLE 4. LM unit root tests on per capita GDP differences with one break

	Change in the intercept			Change in both the intercept and the linear time trend		
	LM stat	T _B	Converging?	LM stat	T _B	Converging?
Differences of log real per capita GDP series with the U.S.						
Algeria	-2.85	1961	U	-3.48	1961	U
Angola	-2.14	1992	U	-3.22	1973	U
Ecuador	-2.93	1986	U	-4.16	1981	U
Gabon	-2.12	1978	U	-3.84	1978	U
Indonesia	-2.78	1970	U	-4.46*	1963	C
Iran	-3.14	1981	U	-3.33	1984	U
Iraq	-2.15	1997	U	-4.63*	1989	D
Kuwait	-1.89	1989	U	-4.12	1979	U
Libya	-1.91	1974	U	-2.41	1979	U
Nigeria	-2.66	1977	U	-3.97	1981	U
Qatar	-2.81	1997	U	-4.09	1981	U
Saudi Arabia	-2.59	1989	U	-4.49*	1981	D
United Arab Emirates	-1.84	1988	U	-3.96	1991	U
Venezuela	-1.68	1995	U	-3.54	1981	U
Differences of log real per capita GDP series with Africa						
Algeria	-3.34	1961	U	-3.29	1961	U
Angola	-2.28	1965	U	-3.33	1982	U
Gabon	-2.36	1975	U	-4.50*	1972	D
Libya	-2.33	1974	U	-3.63	1978	U
Nigeria	-2.41	1974	U	-4.21*	1967	C
Differences of log real per capita GDP series with Latin America						
Ecuador	-2.84	1992	U	-4.68*	1986	D
Venezuela	-1.67	1979	U	-4.30	1978	U
Differences of log real per capita GDP series with Hong Kong						
Indonesia	-1.41	1999	U	-5.00*	1972	C
Differences of log real per capita GDP series with West Asia						
Iran	-2.98	1981	U	-3.44	1986	U
Iraq	-1.98	1994	U	-7.95**	1989	D
Kuwait	-2.46	1969	U	-4.53*	1980	D
Qatar	-2.73	1965	U	-4.55*	1981	D
Saudi Arabia	-2.13	1989	U	-4.35	1974	U
United Arab Emirates	-1.87	1977	U	-3.12	1983	U

The 10%, 5% and 1% asymptotic critical values have been obtained from Lee and Strazicich (2001). *, ** and *** indicate significant at the 10%, 5% and 1% levels, respectively. C denotes catch-up, D denotes divergence, and U denotes unit root.

In Table 4 we report the minimum LM statistic and the date of the break when we allow for only one break, while Table 5 reports the minimum LM statistic and the date of the breaks when the possibility of two structural breaks is included.

TABLE 5. LM unit root tests on per capita GDP differences with two breaks

	Change in the intercept				Change in both the intercept and the linear time trend			
	LM stat	T _{B1}	T _{B2}		LM stat	T _{B1}	T _{B2}	
Differences of log real per capita GDP series with the U.S.								
Algeria	-2.85	1960	1976	U	-4.47	1959	1963	U
Angola	-2.15	1973	1995	U	-5.42*	1973	1997	C
Ecuador	-3.01	1986	1998	U	-5.30	1971	1991	U
Gabon	-2.53	1975	1978	U	-6.72**	1972	1985	D
Indonesia	-3.28	1978	2001	U	-5.58*	1962	1991	C
Iran	-3.17	1976	1980	U	-4.97	1971	1989	U
Iraq	-1.94	1978	1998	U	-7.02**	1970	1989	D
Kuwait	-2.50	1968	1998	U	-5.62*	1977	1982	D
Libya	-1.96	1972	1979	U	-5.41*	1968	1998	D
Nigeria	-2.94	1976	1979	U	-4.57	1968	1988	U
Qatar	-2.81	1997	2000	U	-4.94	1978	1994	U
Saudi Arabia	-2.90	1982	1986	U	-6.62**	1970	1981	D
United Arab Emirates	-1.92	1972	1976	U	-5.02	1968	1983	U
Venezuela	-2.03	1988	1995	U	-5.23	1980	1995	U
Differences of log real per capita GDP series with Africa								
Algeria	-3.55	1961	1987	U	-5.08	1961	1986	U
Angola	-2.29	1965	1972	U	-4.87	1973	1986	U
Gabon	-3.16	1978	1984	U	-4.38	1965	1981	U
Libya	-2.51	1974	1981	U	-6.71**	1966	1985	D
Nigeria	-2.57	1972	1974	U	-6.60**	1966	1984	C
Differences of log real per capita GDP series with Latin America								
Ecuador	-3.11	1986	1992	U	-6.93**	1980	1998	D
Venezuela	-1.72	1979	1988	U	-5.07	1964	1978	U
Differences of log real per capita GDP series with East Asia								
Indonesia	-1.52	1983	1999	U	-6.18**	1965	1984	C
Differences of log real per capita GDP series with West Asia								
Iran	-3.11	1981	1997	U	-4.64	1962	1983	U
Iraq	-2.13	1987	1990	U	-7.62**	1971	1989	D
Kuwait	-2.48	1969	1998	U	-5.73*	1968	1982	C
Qatar	-2.63	1965	1977	U	-5.12	1981	1995	U
Saudi Arabia	-2.21	1976	1983	U	-5.50*	1981	1992	D
United Arab Emirates	-1.99	1977	1985	U	-4.80	1969	1984	U

The 10%, 5% and 1% asymptotic critical values have been obtained from Lee and Strazicich (2001). *, ** and *** indicate significant at the 10%, 5% and 1% levels, respectively. C denotes catch-up D denotes divergence and U denotes unit root.

The main results presented in these tables may be summarized as follows: First, a broad examination of the significance of the dummy variables indicate that

the convergence processes of the different OPEC countries have experienced structural changes which should be taken into account when analyzing the order of integration of relative incomes. For example, when we allow for a break, this occurs for most of the countries in 1979-1981, coinciding with the end of the 1979 oil crisis, when oil prices start increasing. When we include the possibility of two structural breaks, the results suggest the existence of a break at the end of sixties or beginning of seventies, before the 1973 oil crisis, and a second one at the mid-eighties-beginning of nineties.

Second, we can reject the unit root null hypothesis (in model C) in three cases (Indonesia, Iraq and Saudi Arabia) when allowing for a structural break and in 6 cases when including two structural breaks (Angola, Indonesia, Iraq, Kuwait, Libya and Saudi Arabia), when analyzing per capita GDP differences with respect to the U.S. However, stationarity does not mean convergence, since it is also needed that countries with a per capita output level below average must have grown more than the average. In order to test for this hypothesis, we follow Tomljanovich and Vogelsang (2002) and Nieswiadomy and Strazicich (2004) and study if there has been a catch-up process in per capita output after the structural break for all these cases, so that we run the following two regressions (depending on whether we allow for one or two breaks):

$$RI_t = \mu_1 + \mu_2 + \beta_1 t_1 + \beta_2 t_2 + u_t, \quad (2.1)$$

$$RI_t = \mu_1 + \mu_2 + \mu_3 + \beta_1 t_1 + \beta_2 t_2 + \beta_3 t + u_t, \quad (2.2)$$

where, for example, in equation (2.2), μ_1 and β_1 are the intercept and the slope before the first break, μ_2 and β_2 the intercept and the slope after the first break and μ_3 and β_3 the intercept and the slope after the second break. Testing for converge for the last period is equivalent to testing whether the parameters μ_3 and β_3 are different from zero and negatively related. The last columns in Tables 4 and 5 summarize the results found in this analysis. In this case, and following

Tomljanovich and Vogelsang (2002) and Nieswiadomy and Strazicich (2004), C denotes catch-up (those cases in which the unit root hypothesis was rejected in favor of stationarity around different time trends and satisfy the β -convergence hypothesis in equations (2.1) and (2.2), D denotes divergence (stationarity around different time trends which do not satisfy the above β -convergence condition), and U denotes unit root (we did not find evidence to reject the unit root null hypothesis). We find evidence of a catch-up process after the break for Indonesia towards the US economy when we allow for only a break and for Angola and Indonesia when we allow for two possible breaks.

When we define per capita differences relative to the regional reference, we also find evidence of catch-up for Kuwait relative to West-Asian countries.

4. Concluding Remarks

In this article we have examined the real convergence process for 14 OPEC countries by means of using time-series tests over the period 1950-2006. We have defined convergence both towards the U.S. economy and towards alternative regional references, defined as the per capita GDP average of the region of each country (Africa, Latin America, East Asia and West Asia). Real convergence tests have been carried first based on ADF unit root tests, and then allowing for structural breaks.

Using ADF unit root tests, we find no evidence of unconditional convergence for any of the OPEC countries towards the U.S., although we find evidence of convergence for Nigeria towards the African average.

However, when we analyze the possibility of structural breaks, we find significant evidence of a structural break in the convergence process of these countries, with the break occurring in many cases 1979-1981. We interpret this

result indicating that the relative performance of these countries is related to the oil price, which after the 1979 crisis, experienced an increase. When we allow for this break, we find evidence of a catch-up process for Indonesia towards the U.S. However, the results suggest that, in general, OPEC countries have suffered the 1979 oil crisis in a more severe way than other countries.

When we apply unit root tests allowing for these two structural breaks, we find evidence of a catch-up process for two of the countries (Indonesia, Angola) towards the U.S. economy. In general, OPEC countries have experienced relatively higher growth rates after mid-eighties-nineties (the years coinciding with the second structural break). Furthermore, we also find convergence for Nigeria relative to Africa and Kuwait relative to West Asian countries after this second break. However, the results also suggest that relative per capita GDP in OPEC countries has grown below average in most of the cases, both when convergence is measured relative to US and when measured relative to regional references. That is, growth rates of most of these countries seem to be very dependent of oil prices.

References

- Atkins, F.J. and Chan, M., 2004, Trend breaks and the Fisher hypothesis in Canada and the United States, *Applied Economics* 36, 1907-1913.
- Barro, R., 1991, Economic growth in a cross section of countries, *The Quarterly Journal of Economics* 106, 407-443.
- Barro, R. and Sala-i-Martin, X., 1991, Convergence across states and regions, *Brookings Papers of Economic Activity* 1, 107-182.
- Barro, R. and Sala-i-Martin, X. 1992, Convergence, *Journal of Political Economy* 100, 223-251.
- Barro, R. and Sala-i-Martin, X., 1995, *Economic Growth*, McGraw Hill.
- Baumol, W. J., 1986, Productivity growth, convergence, and welfare: what the long-run data show, *American Economic Review* 76, 1072-1085.
- Beliu, S. and Higgins, M.L, 2004, Fractional cointegration analysis of EU convergence, *Applied Economics* 36, 1607-1611.
- Bernard, A.B., 1991, Empirical implications of the convergence hypothesis, Working Paper, *Center for Economic Policy Research*, Stanford University.
- Bernard, A.B. and Durlauf, S.N., 1995, Convergence in international output, *Journal of Applied Econometrics* 10, 97-108.
- Campbell, J.Y. and Mankiw, N.G., 1989, International evidence on the persistence of economic fluctuations, *Journal of Monetary Economics* 23, 319-333.
- Carlino, G.A. and Mills, L.O., 1993, Are U.S. regional incomes converging? A time series analysis, *Journal of Monetary Economics* 32, 335-346.
- Cellini, R. and Scorcu, A., 2000, Segmented stochastic convergence across the G-7 countries, *Empirical Economics* 25, 463-474.
- Christiano, L.J., 1992, Searching for breaks in GNP, *Journal of Business and Economic Statistics* 10, 237-250.
- Cogley, T., 1990, International evidence on the size of the random walk in output, *Journal of Political Economy* 98, 501-518.

Cunado, J., Gil-Alana, L.A. and Perez de Gracia, F., 2003, Empirical evidence on real convergence in some OECD countries, *Applied Economics Letters* 10, 173-176.

DeLong, J.B., 1988, Productivity growth, convergence and welfare: comment, *American Economic Review* 78, 1138-1154.

Dickey, D. A. and Fuller, W. A., 1979, Distribution of the estimators for autoregressive time series with a unit root, *Journal of the American Statistical Association* 74, 427-431.

Dowrick, S. and Nguyen, D. T., 1989, OECD comparative economic growth 1950-1985: catch-up and convergence, *American Economic Review* 79, 1010-1030.

Greasly, D. and Oxley, 1997, Time-series based tests of the convergence hypothesis: some positive results, *Economic Letters* 56, 143-147.

Grier, K.B. and Tullock, G., 1989, An empirical analysis of cross-national economic growth, 1951-1980, *Journal of Monetary Economics* 24, 259-276.

Lee, J. and Strazicich, M.C., 2001, Break point estimation and spurious rejections with endogenous unit root tests, *Oxford Bulletin of Economics and Statistics* 63, 535-558.

Lee, J. and Strazicich, M.C., 2003, Minimum LM unit root test with two structural breaks, *Review of Economics and Statistics* 85, 1082-1089.

Leybourne, S.J. and Newbold, P., 2003, Spurious rejections by cointegration tests induced by structural breaks, *Applied Economics* 35, 1117-1121.

Lucas, R., 1988, On the mechanics of economic development, *Journal of Monetary Economics* 22, 3-41.

Maddison, A., 2001, *The world economy: A millennial perspective*, Paris, OECD.

Mankiw, G., Romer, P. and Weil, D. N., 1992, A contribution to the empirics of economic growth, *The Quarterly Journal of Economics* 107, 407-437.

Mehlum, H., Moene, K.O., Tovik, R., 2006, Institutions and the resource curse, *Economic Journal* 116, 1-20.

Narayan, P.K., 2005a, The structure of tourist expenditure in Fiji: evidence from unit root structural break tests, *Applied Economics* 37, 1157-1161.

Narayan, P.K., 2005b, New evidence on purchasing power parity from 17 OECD countries, *Applied Economics* 37, 1063-1071.

Nieswiadomy, M.L. and Strazicich, M.C., 2004, Are political freedoms converging?, *Economic Inquiry* 42, 323-340.

Nunes, L., Newbold, P. and Kuan, C., 1997, Testing for unit roots with breaks: evidence on the great crash and the unit root hypothesis reconsidered, *Oxford Bulletin of Economics and Statistics* 57, 435-448.

Oxley, L. and D. Greasley, 1995, A time-series perspective on convergence: Australia, UK, and US since 1870, *The Economic Record* 71, 259-270.

Perron, P. and Vogelsang, T.J., 1992, Nonstationarity and level shifts with an application to Purchasing Power Parity, *Journal of Business and Economic Statistics* 10, 301-320.

Phillips, P. C. B. and Perron, P., 1988, Testing for a unit root in a time series regression, *Biometrika* 75, 335-346.

Romer, P., 1986, Increasing returns and long-run growth, *Journal of Political Economy* 94, 1002-1037.

Sachs, J.D. and Warner, A.M., 1999, The Big Push, Natural Resource Booms and Growth, *Journal of Development Economics* 67, 445-470.

Sachs, J.D. and Warner, A.M., 2001, The curse of natural resources, *European Economic Review* 45, 827-838.

Sala-i-Martin, X., 1997, I just ran two millions regressions, *American Economic Review* 87, 178-183.

Sen, A., 2004, Are US macroeconomic series difference stationary or trend-break stationary?, *Applied Economics* 36, 2025-2029.

Solow, R.M., 1956, A contribution to the theory of economic growth, *The Quarterly Journal of Economics* 70, 65-94.

St. Aubyn, M., 1999, Convergence across industrialised countries (1890-1989): new results using time series methods, *Empirical Economics* 24, 23-44.

Strazicich, M.C., Lee, J. and Day, E., 2003, Are incomes converging among OECD countries? Time series evidence with two structural breaks, *Journal of Macroeconomics* 26, 131-145.

Tomljanovich, M. and Vogelsang, T.J., 2002, Are US regions converging? Using new econometric methods to examine old issues, *Empirical Economics* 27, 49-62.

Zivot, E. and D.W.K. Andrews, 1992, Further evidence on the great crash, the oil price shock and the unit root hypothesis, *Journal of Business and Economic Statistics* 10, 251-270.

FUNDACIÓN DE LAS CAJAS DE AHORROS

DOCUMENTOS DE TRABAJO

Últimos números publicados

- 159/2000 Participación privada en la construcción y explotación de carreteras de peaje
Ginés de Rus, Manuel Romero y Lourdes Trujillo
- 160/2000 Errores y posibles soluciones en la aplicación del *Value at Risk*
Mariano González Sánchez
- 161/2000 Tax neutrality on saving assets. The spanish case before and after the tax reform
Cristina Ruza y de Paz-Curbera
- 162/2000 Private rates of return to human capital in Spain: new evidence
F. Barceinas, J. Oliver-Alonso, J.L. Raymond y J.L. Roig-Sabaté
- 163/2000 El control interno del riesgo. Una propuesta de sistema de límites
riesgo neutral
Mariano González Sánchez
- 164/2001 La evolución de las políticas de gasto de las Administraciones Públicas en los años 90
Alfonso Utrilla de la Hoz y Carmen Pérez Esparrells
- 165/2001 Bank cost efficiency and output specification
Emili Tortosa-Ausina
- 166/2001 Recent trends in Spanish income distribution: A robust picture of falling income inequality
Josep Oliver-Alonso, Xavier Ramos y José Luis Raymond-Bara
- 167/2001 Efectos redistributivos y sobre el bienestar social del tratamiento de las cargas familiares en
el nuevo IRPF
Nuria Badenes Plá, Julio López Laborda, Jorge Onrubia Fernández
- 168/2001 The Effects of Bank Debt on Financial Structure of Small and Medium Firms in some Euro-
pean Countries
Mónica Melle-Hernández
- 169/2001 La política de cohesión de la UE ampliada: la perspectiva de España
Ismael Sanz Labrador
- 170/2002 Riesgo de liquidez de Mercado
Mariano González Sánchez
- 171/2002 Los costes de administración para el afiliado en los sistemas de pensiones basados en cuentas
de capitalización individual: medida y comparación internacional.
José Enrique Devesa Carpio, Rosa Rodríguez Barrera, Carlos Vidal Meliá
- 172/2002 La encuesta continua de presupuestos familiares (1985-1996): descripción, representatividad
y propuestas de metodología para la explotación de la información de los ingresos y el gasto.
Llorenç Pou, Joaquín Alegre
- 173/2002 Modelos paramétricos y no paramétricos en problemas de concesión de tarjetas de crédito.
Rosa Puertas, María Bonilla, Ignacio Olmeda

- 174/2002 Mercado único, comercio intra-industrial y costes de ajuste en las manufacturas españolas.
José Vicente Blanes Cristóbal
- 175/2003 La Administración tributaria en España. Un análisis de la gestión a través de los ingresos y de los gastos.
Juan de Dios Jiménez Aguilera, Pedro Enrique Barrilao González
- 176/2003 The Falling Share of Cash Payments in Spain.
Santiago Carbó Valverde, Rafael López del Paso, David B. Humphrey
Publicado en "Moneda y Crédito" nº 217, pags. 167-189.
- 177/2003 Effects of ATMs and Electronic Payments on Banking Costs: The Spanish Case.
Santiago Carbó Valverde, Rafael López del Paso, David B. Humphrey
- 178/2003 Factors explaining the interest margin in the banking sectors of the European Union.
Joaquín Maudos y Juan Fernández Guevara
- 179/2003 Los planes de stock options para directivos y consejeros y su valoración por el mercado de valores en España.
Mónica Melle Hernández
- 180/2003 Ownership and Performance in Europe and US Banking – A comparison of Commercial, Co-operative & Savings Banks.
Yener Altunbas, Santiago Carbó y Phil Molyneux
- 181/2003 The Euro effect on the integration of the European stock markets.
Mónica Melle Hernández
- 182/2004 In search of complementarity in the innovation strategy: international R&D and external knowledge acquisition.
Bruno Cassiman, Reinhilde Veugelers
- 183/2004 Fijación de precios en el sector público: una aplicación para el servicio municipal de suministro de agua.
M^a Ángeles García Valiñas
- 184/2004 Estimación de la economía sumergida en España: un modelo estructural de variables latentes.
Ángel Alañón Pardo, Miguel Gómez de Antonio
- 185/2004 Causas políticas y consecuencias sociales de la corrupción.
Joan Oriol Prats Cabrera
- 186/2004 Loan bankers' decisions and sensitivity to the audit report using the belief revision model.
Andrés Guiral Contreras and José A. Gonzalo Angulo
- 187/2004 El modelo de Black, Derman y Toy en la práctica. Aplicación al mercado español.
Marta Tolentino García-Abadillo y Antonio Díaz Pérez
- 188/2004 Does market competition make banks perform well?.
Mónica Melle
- 189/2004 Efficiency differences among banks: external, technical, internal, and managerial
Santiago Carbó Valverde, David B. Humphrey y Rafael López del Paso

- 190/2004 Una aproximación al análisis de los costes de la esquizofrenia en España: los modelos jerárquicos bayesianos
F. J. Vázquez-Polo, M. A. Negrín, J. M. Cavasés, E. Sánchez y grupo RIRAG
- 191/2004 Environmental proactivity and business performance: an empirical analysis
Javier González-Benito y Óscar González-Benito
- 192/2004 Economic risk to beneficiaries in notional defined contribution accounts (NDCs)
Carlos Vidal-Meliá, Inmaculada Domínguez-Fabian y José Enrique Devesa-Carpio
- 193/2004 Sources of efficiency gains in port reform: non parametric malmquist decomposition tfp index for Mexico
Antonio Estache, Beatriz Tovar de la Fé y Lourdes Trujillo
- 194/2004 Persistencia de resultados en los fondos de inversión españoles
Alfredo Ciriaco Fernández y Rafael Santamaría Aquilué
- 195/2005 El modelo de revisión de creencias como aproximación psicológica a la formación del juicio del auditor sobre la gestión continuada
Andrés Guiral Contreras y Francisco Esteso Sánchez
- 196/2005 La nueva financiación sanitaria en España: descentralización y prospectiva
David Cantarero Prieto
- 197/2005 A cointegration analysis of the Long-Run supply response of Spanish agriculture to the common agricultural policy
José A. Mendez, Ricardo Mora y Carlos San Juan
- 198/2005 ¿Refleja la estructura temporal de los tipos de interés del mercado español preferencia por la liquidez?
Magdalena Massot Perelló y Juan M. Nave
- 199/2005 Análisis de impacto de los Fondos Estructurales Europeos recibidos por una economía regional: Un enfoque a través de Matrices de Contabilidad Social
M. Carmen Lima y M. Alejandro Cardenete
- 200/2005 Does the development of non-cash payments affect monetary policy transmission?
Santiago Carbó Valverde y Rafael López del Paso
- 201/2005 Firm and time varying technical and allocative efficiency: an application for port cargo handling firms
Ana Rodríguez-Álvarez, Beatriz Tovar de la Fe y Lourdes Trujillo
- 202/2005 Contractual complexity in strategic alliances
Jeffrey J. Reuer y Africa Ariño
- 203/2005 Factores determinantes de la evolución del empleo en las empresas adquiridas por opa
Nuria Alcalde Fradejas y Inés Pérez-Soba Aguilar
- 204/2005 Nonlinear Forecasting in Economics: a comparison between Comprehension Approach versus Learning Approach. An Application to Spanish Time Series
Elena Olmedo, Juan M. Valderas, Ricardo Gimeno and Lorenzo Escot

- 205/2005 Precio de la tierra con presión urbana: un modelo para España
Esther Decimavilla, Carlos San Juan y Stefan Sperlich
- 206/2005 Interregional migration in Spain: a semiparametric analysis
Adolfo Maza y José Villaverde
- 207/2005 Productivity growth in European banking
Carmen Murillo-Melchor, José Manuel Pastor y Emili Tortosa-Ausina
- 208/2005 Explaining Bank Cost Efficiency in Europe: Environmental and Productivity Influences.
Santiago Carbó Valverde, David B. Humphrey y Rafael López del Paso
- 209/2005 La elasticidad de sustitución intertemporal con preferencias no separables intratemporalmente: los casos de Alemania, España y Francia.
Elena Márquez de la Cruz, Ana R. Martínez Cañete y Inés Pérez-Soba Aguilar
- 210/2005 Contribución de los efectos tamaño, book-to-market y momentum a la valoración de activos: el caso español.
Begoña Font-Belaire y Alfredo Juan Grau-Grau
- 211/2005 Permanent income, convergence and inequality among countries
José M. Pastor and Lorenzo Serrano
- 212/2005 The Latin Model of Welfare: Do 'Insertion Contracts' Reduce Long-Term Dependence?
Luis Ayala and Magdalena Rodríguez
- 213/2005 The effect of geographic expansion on the productivity of Spanish savings banks
Manuel Illueca, José M. Pastor and Emili Tortosa-Ausina
- 214/2005 Dynamic network interconnection under consumer switching costs
Ángel Luis López Rodríguez
- 215/2005 La influencia del entorno socioeconómico en la realización de estudios universitarios: una aproximación al caso español en la década de los noventa
Marta Rahona López
- 216/2005 The valuation of spanish ipos: efficiency analysis
Susana Álvarez Otero
- 217/2005 On the generation of a regular multi-input multi-output technology using parametric output distance functions
Sergio Perelman and Daniel Santin
- 218/2005 La gobernanza de los procesos parlamentarios: la organización industrial del congreso de los diputados en España
Gonzalo Caballero Miguez
- 219/2005 Determinants of bank market structure: Efficiency and political economy variables
Francisco González
- 220/2005 Agresividad de las órdenes introducidas en el mercado español: estrategias, determinantes y medidas de performance
David Abad Díaz

- 221/2005 Tendencia post-anuncio de resultados contables: evidencia para el mercado español
Carlos Forner Rodríguez, Joaquín Marhuenda Fructuoso y Sonia Sanabria García
- 222/2005 Human capital accumulation and geography: empirical evidence in the European Union
Jesús López-Rodríguez, J. Andrés Faiña y Jose Lopez Rodríguez
- 223/2005 Auditors' Forecasting in Going Concern Decisions: Framing, Confidence and Information Processing
Waymond Rodgers and Andrés Guiral
- 224/2005 The effect of Structural Fund spending on the Galician region: an assessment of the 1994-1999 and 2000-2006 Galician CSFs
José Ramón Cancelo de la Torre, J. Andrés Faiña and Jesús López-Rodríguez
- 225/2005 The effects of ownership structure and board composition on the audit committee activity: Spanish evidence
Carlos Fernández Méndez and Rubén Arrondo García
- 226/2005 Cross-country determinants of bank income smoothing by managing loan loss provisions
Ana Rosa Fonseca and Francisco González
- 227/2005 Incumplimiento fiscal en el irpf (1993-2000): un análisis de sus factores determinantes
Alejandro Estellér Moré
- 228/2005 Region versus Industry effects: volatility transmission
Pilar Soriano Felipe and Francisco J. Climent Diranzo
- 229/2005 Concurrent Engineering: The Moderating Effect Of Uncertainty On New Product Development Success
Daniel Vázquez-Bustelo and Sandra Valle
- 230/2005 On zero lower bound traps: a framework for the analysis of monetary policy in the 'age' of central banks
Alfonso Palacio-Vera
- 231/2005 Reconciling Sustainability and Discounting in Cost Benefit Analysis: a methodological proposal
M. Carmen Almansa Sáez and Javier Calatrava Requena
- 232/2005 Can The Excess Of Liquidity Affect The Effectiveness Of The European Monetary Policy?
Santiago Carbó Valverde and Rafael López del Paso
- 233/2005 Inheritance Taxes In The Eu Fiscal Systems: The Present Situation And Future Perspectives.
Miguel Angel Barberán Lahuerta
- 234/2006 Bank Ownership And Informativeness Of Earnings.
Víctor M. González
- 235/2006 Developing A Predictive Method: A Comparative Study Of The Partial Least Squares Vs Maximum Likelihood Techniques.
Waymond Rodgers, Paul Pavlou and Andres Guiral.
- 236/2006 Using Compromise Programming for Macroeconomic Policy Making in a General Equilibrium Framework: Theory and Application to the Spanish Economy.
Francisco J. André, M. Alejandro Cardenete y Carlos Romero.

- 237/2006 Bank Market Power And Sme Financing Constraints.
Santiago Carbó-Valverde, Francisco Rodríguez-Fernández y Gregory F. Udell.
- 238/2006 Trade Effects Of Monetary Agreements: Evidence For Oecd Countries.
Salvador Gil-Pareja, Rafael Llorca-Vivero y José Antonio Martínez-Serrano.
- 239/2006 The Quality Of Institutions: A Genetic Programming Approach.
Marcos Álvarez-Díaz y Gonzalo Caballero Miguez.
- 240/2006 La interacción entre el éxito competitivo y las condiciones del mercado doméstico como determinantes de la decisión de exportación en las Pymes.
Francisco García Pérez.
- 241/2006 Una estimación de la depreciación del capital humano por sectores, por ocupación y en el tiempo.
Inés P. Murillo.
- 242/2006 Consumption And Leisure Externalities, Economic Growth And Equilibrium Efficiency.
Manuel A. Gómez.
- 243/2006 Measuring efficiency in education: an analysis of different approaches for incorporating non-discretionary inputs.
Jose Manuel Cordero-Ferrera, Francisco Pedraja-Chaparro y Javier Salinas-Jiménez
- 244/2006 Did The European Exchange-Rate Mechanism Contribute To The Integration Of Peripheral Countries?.
Salvador Gil-Pareja, Rafael Llorca-Vivero y José Antonio Martínez-Serrano
- 245/2006 Intergenerational Health Mobility: An Empirical Approach Based On The Echp.
Marta Pascual and David Cantarero
- 246/2006 Measurement and analysis of the Spanish Stock Exchange using the Lyapunov exponent with digital technology.
Salvador Rojí Ferrari and Ana Gonzalez Marcos
- 247/2006 Testing For Structural Breaks In Variance With additive Outliers And Measurement Errors.
Paulo M.M. Rodrigues and Antonio Rubia
- 248/2006 The Cost Of Market Power In Banking: Social Welfare Loss Vs. Cost Inefficiency.
Joaquín Maudos and Juan Fernández de Guevara
- 249/2006 Elasticidades de largo plazo de la demanda de vivienda: evidencia para España (1885-2000).
Desiderio Romero Jordán, José Félix Sanz Sanz y César Pérez López
- 250/2006 Regional Income Disparities in Europe: What role for location?.
Jesús López-Rodríguez and J. Andrés Faña
- 251/2006 Funciones abreviadas de bienestar social: Una forma sencilla de simultaneizar la medición de la eficiencia y la equidad de las políticas de gasto público.
Nuria Badenes Plá y Daniel Santín González
- 252/2006 "The momentum effect in the Spanish stock market: Omitted risk factors or investor behaviour?".
Luis Muga and Rafael Santamaría
- 253/2006 Dinámica de precios en el mercado español de gasolina: un equilibrio de colusión tácita.
Jordi Perdiguero García

- 254/2006 Desigualdad regional en España: renta permanente versus renta corriente.
José M. Pastor, Empar Pons y Lorenzo Serrano
- 255/2006 Environmental implications of organic food preferences: an application of the impure public goods model.
Ana Maria Aldanondo-Ochoa y Carmen Almansa-Sáez
- 256/2006 Family tax credits versus family allowances when labour supply matters: Evidence for Spain.
José Felix Sanz-Sanz, Desiderio Romero-Jordán y Santiago Álvarez-García
- 257/2006 La internacionalización de la empresa manufacturera española: efectos del capital humano genérico y específico.
José López Rodríguez
- 258/2006 Evaluación de las migraciones interregionales en España, 1996-2004.
María Martínez Torres
- 259/2006 Efficiency and market power in Spanish banking.
Rolf Färe, Shawna Grosskopf y Emili Tortosa-Ausina.
- 260/2006 Asimetrías en volatilidad, beta y contagios entre las empresas grandes y pequeñas cotizadas en la bolsa española.
Helena Chuliá y Hipòlit Torró.
- 261/2006 Birth Replacement Ratios: New Measures of Period Population Replacement.
José Antonio Ortega.
- 262/2006 Accidentes de tráfico, víctimas mortales y consumo de alcohol.
José M^a Arranz y Ana I. Gil.
- 263/2006 Análisis de la Presencia de la Mujer en los Consejos de Administración de las Mil Mayores Empresas Españolas.
Ruth Mateos de Cabo, Lorenzo Escot Mangas y Ricardo Gimeno Nogués.
- 264/2006 Crisis y Reforma del Pacto de Estabilidad y Crecimiento. Las Limitaciones de la Política Económica en Europa.
Ignacio Álvarez Peralta.
- 265/2006 Have Child Tax Allowances Affected Family Size? A Microdata Study For Spain (1996-2000).
Jaime Vallés-Giménez y Anabel Zárate-Marco.
- 266/2006 Health Human Capital And The Shift From Foraging To Farming.
Paolo Rungo.
- 267/2006 Financiación Autonómica y Política de la Competencia: El Mercado de Gasolina en Canarias.
Juan Luis Jiménez y Jordi Perdiguero.
- 268/2006 El cumplimiento del Protocolo de Kyoto para los hogares españoles: el papel de la imposición sobre la energía.
Desiderio Romero-Jordán y José Félix Sanz-Sanz.
- 269/2006 Banking competition, financial dependence and economic growth
Joaquín Maudos y Juan Fernández de Guevara
- 270/2006 Efficiency, subsidies and environmental adaptation of animal farming under CAP
Werner Kleinhanß, Carmen Murillo, Carlos San Juan y Stefan Sperlich

- 271/2006 Interest Groups, Incentives to Cooperation and Decision-Making Process in the European Union
A. Garcia-Lorenzo y Jesús López-Rodríguez
- 272/2006 Riesgo asimétrico y estrategias de momentum en el mercado de valores español
Luis Muga y Rafael Santamaría
- 273/2006 Valoración de capital-riesgo en proyectos de base tecnológica e innovadora a través de la teoría de opciones reales
Gracia Rubio Martín
- 274/2006 Capital stock and unemployment: searching for the missing link
Ana Rosa Martínez-Cañete, Elena Márquez de la Cruz, Alfonso Palacio-Vera and Inés Pérez-Soba Aguilar
- 275/2006 Study of the influence of the voters' political culture on vote decision through the simulation of a political competition problem in Spain
Sagrario Lantarón, Isabel Lillo, M^a Dolores López and Javier Rodrigo
- 276/2006 Investment and growth in Europe during the Golden Age
Antonio Cubel and M^a Teresa Sanchis
- 277/2006 Efectos de vincular la pensión pública a la inversión en cantidad y calidad de hijos en un modelo de equilibrio general
Robert Meneu Gaya
- 278/2006 El consumo y la valoración de activos
Elena Márquez y Belén Nieto
- 279/2006 Economic growth and currency crisis: A real exchange rate entropic approach
David Matesanz Gómez y Guillermo J. Ortega
- 280/2006 Three measures of returns to education: An illustration for the case of Spain
María Arrazola y José de Hevia
- 281/2006 Composition of Firms versus Composition of Jobs
Antoni Cunyat
- 282/2006 La vocación internacional de un holding tranviario belga: la Compagnie Mutuelle de Tramways, 1895-1918
Alberte Martínez López
- 283/2006 Una visión panorámica de las entidades de crédito en España en la última década.
Constantino García Ramos
- 284/2006 Foreign Capital and Business Strategies: a comparative analysis of urban transport in Madrid and Barcelona, 1871-1925
Alberte Martínez López
- 285/2006 Los intereses belgas en la red ferroviaria catalana, 1890-1936
Alberte Martínez López
- 286/2006 The Governance of Quality: The Case of the Agrifood Brand Names
Marta Fernández Barcala, Manuel González-Díaz y Emmanuel Raynaud
- 287/2006 Modelling the role of health status in the transition out of malthusian equilibrium
Paolo Rungo, Luis Currais and Berta Rivera
- 288/2006 Industrial Effects of Climate Change Policies through the EU Emissions Trading Scheme
Xavier Labandeira and Miguel Rodríguez

- 289/2006 Globalisation and the Composition of Government Spending: An analysis for OECD countries
Norman Gemmell, Richard Kneller and Ismael Sanz
- 290/2006 La producción de energía eléctrica en España: Análisis económico de la actividad tras la liberalización del Sector Eléctrico
Fernando Hernández Martínez
- 291/2006 Further considerations on the link between adjustment costs and the productivity of R&D investment: evidence for Spain
Desiderio Romero-Jordán, José Félix Sanz-Sanz and Inmaculada Álvarez-Ayuso
- 292/2006 Una teoría sobre la contribución de la función de compras al rendimiento empresarial
Javier González Benito
- 293/2006 Agility drivers, enablers and outcomes: empirical test of an integrated agile manufacturing model
Daniel Vázquez-Bustelo, Lucía Avella and Esteban Fernández
- 294/2006 Testing the parametric vs the semiparametric generalized mixed effects models
María José Lombardía and Stefan Sperlich
- 295/2006 Nonlinear dynamics in energy futures
Mariano Matilla-García
- 296/2006 Estimating Spatial Models By Generalized Maximum Entropy Or How To Get Rid Of W
Esteban Fernández Vázquez, Matías Mayor Fernández and Jorge Rodríguez-Valez
- 297/2006 Optimización fiscal en las transmisiones lucrativas: análisis metodológico
Félix Domínguez Barrero
- 298/2006 La situación actual de la banca online en España
Francisco José Climent Diranzo y Alexandre Momparler Pechuán
- 299/2006 Estrategia competitiva y rendimiento del negocio: el papel mediador de la estrategia y las capacidades productivas
Javier González Benito y Isabel Suárez González
- 300/2006 A Parametric Model to Estimate Risk in a Fixed Income Portfolio
Pilar Abad and Sonia Benito
- 301/2007 Análisis Empírico de las Preferencias Sociales Respecto del Gasto en Obra Social de las Cajas de Ahorros
Alejandro Esteller-Moré, Jonathan Jorba Jiménez y Albert Solé-Ollé
- 302/2007 Assessing the enlargement and deepening of regional trading blocs: The European Union case
Salvador Gil-Pareja, Rafael Llorca-Vivero y José Antonio Martínez-Serrano
- 303/2007 ¿Es la Franquicia un Medio de Financiación?: Evidencia para el Caso Español
Vanessa Solís Rodríguez y Manuel González Díaz
- 304/2007 On the Finite-Sample Biases in Nonparametric Testing for Variance Constancy
Paulo M.M. Rodrigues and Antonio Rubia
- 305/2007 Spain is Different: Relative Wages 1989-98
José Antonio Carrasco Gallego

- 306/2007 Poverty reduction and SAM multipliers: An evaluation of public policies in a regional framework
Francisco Javier De Miguel-Vélez y Jesús Pérez-Mayo
- 307/2007 La Eficiencia en la Gestión del Riesgo de Crédito en las Cajas de Ahorro
Marcelino Martínez Cabrera
- 308/2007 Optimal environmental policy in transport: unintended effects on consumers' generalized price
M. Pilar Socorro and Ofelia Betancor
- 309/2007 Agricultural Productivity in the European Regions: Trends and Explanatory Factors
Roberto Ezcurra, Belen Iraizoz, Pedro Pascual and Manuel Rapún
- 310/2007 Long-run Regional Population Divergence and Modern Economic Growth in Europe: a Case Study of Spain
María Isabel Ayuda, Fernando Collantes and Vicente Pinilla
- 311/2007 Financial Information effects on the measurement of Commercial Banks' Efficiency
Borja Amor, María T. Tascón and José L. Fanjul
- 312/2007 Neutralidad e incentivos de las inversiones financieras en el nuevo IRPF
Félix Domínguez Barrero
- 313/2007 The Effects of Corporate Social Responsibility Perceptions on The Valuation of Common Stock
Waymond Rodgers , Helen Choy and Andres Guiral-Contreras
- 314/2007 Country Creditor Rights, Information Sharing and Commercial Banks' Profitability Persistence across the world
Borja Amor, María T. Tascón and José L. Fanjul
- 315/2007 ¿Es Relevante el Déficit Corriente en una Unión Monetaria? El Caso Español
Javier Blanco González y Ignacio del Rosal Fernández
- 316/2007 The Impact of Credit Rating Announcements on Spanish Corporate Fixed Income Performance: Returns, Yields and Liquidity
Pilar Abad, Antonio Díaz and M. Dolores Robles
- 317/2007 Indicadores de Lealtad al Establecimiento y Formato Comercial Basados en la Distribución del Presupuesto
Cesar Augusto Bustos Reyes y Óscar González Benito
- 318/2007 Migrants and Market Potential in Spain over The XXth Century: A Test Of The New Economic Geography
Daniel A. Tirado, Jordi Pons, Elisenda Paluzie and Javier Silvestre
- 319/2007 El Impacto del Coste de Oportunidad de la Actividad Emprendedora en la Intención de los Ciudadanos Europeos de Crear Empresas
Luis Miguel Zapico Aldeano
- 320/2007 Los belgas y los ferrocarriles de vía estrecha en España, 1887-1936
Alberte Martínez López
- 321/2007 Competición política bipartidista. Estudio geométrico del equilibrio en un caso ponderado
Isabel Lillo, M^a Dolores López y Javier Rodrigo
- 322/2007 Human resource management and environment management systems: an empirical study
M^a Concepción López Fernández, Ana M^a Serrano Bedía and Gema García Piqueres

- 323/2007 Wood and industrialization. evidence and hypotheses from the case of Spain, 1860-1935.
Iñaki Iriarte-Goñi and María Isabel Ayuda Bosque
- 324/2007 New evidence on long-run monetary neutrality.
J. Cunado, L.A. Gil-Alana and F. Perez de Gracia
- 325/2007 Monetary policy and structural changes in the volatility of us interest rates.
Juncal Cuñado, Javier Gomez Biscarri and Fernando Perez de Gracia
- 326/2007 The productivity effects of intrafirm diffusion.
Lucio Fuentelsaz, Jaime Gómez and Sergio Palomas
- 327/2007 Unemployment duration, layoffs and competing risks.
J.M. Arranz, C. García-Serrano and L. Toharia
- 328/2007 El grado de cobertura del gasto público en España respecto a la UE-15
Nuria Rueda, Begoña Barruso, Carmen Calderón y M^a del Mar Herrador
- 329/2007 The Impact of Direct Subsidies in Spain before and after the CAP'92 Reform
Carmen Murillo, Carlos San Juan and Stefan Sperlich
- 330/2007 Determinants of post-privatisation performance of Spanish divested firms
Laura Cabeza García and Silvia Gómez Ansón
- 331/2007 ¿Por qué deciden diversificar las empresas españolas? Razones oportunistas versus razones económicas
Almudena Martínez Campillo
- 332/2007 Dynamical Hierarchical Tree in Currency Markets
Juan Gabriel Brida, David Matesanz Gómez and Wiston Adrián Risso
- 333/2007 Los determinantes sociodemográficos del gasto sanitario. Análisis con microdatos individuales
Ana María Angulo, Ramón Barberán, Pilar Egea y Jesús Mur
- 334/2007 Why do companies go private? The Spanish case
Inés Pérez-Soba Aguilar
- 335/2007 The use of gis to study transport for disabled people
Verónica Cañal Fernández
- 336/2007 The long run consequences of M&A: An empirical application
Cristina Bernad, Lucio Fuentelsaz and Jaime Gómez
- 337/2007 Las clasificaciones de materias en economía: principios para el desarrollo de una nueva clasificación
Valentín Edo Hernández
- 338/2007 Reforming Taxes and Improving Health: A Revenue-Neutral Tax Reform to Eliminate Medical and Pharmaceutical VAT
Santiago Álvarez-García, Carlos Pestana Barros y Juan Prieto-Rodriguez
- 339/2007 Impacts of an iron and steel plant on residential property values
Celia Bilbao-Terol
- 340/2007 Firm size and capital structure: Evidence using dynamic panel data
Victor M. González and Francisco González

- 341/2007 ¿Cómo organizar una cadena hotelera? La elección de la forma de gobierno
Marta Fernández Barcala y Manuel González Díaz
- 342/2007 Análisis de los efectos de la decisión de diversificar: un contraste del marco teórico “Agencia-Stewardship”
Almudena Martínez Campillo y Roberto Fernández Gago
- 343/2007 Selecting portfolios given multiple eurostoxx-based uncertainty scenarios: a stochastic goal programming approach from fuzzy betas
Enrique Ballester, Blanca Pérez-Gladish, Mar Arenas-Parra and Amelia Bilbao-Terol
- 344/2007 “El bienestar de los inmigrantes y los factores implicados en la decisión de emigrar”
Anastasia Hernández Alemán y Carmelo J. León
- 345/2007 Governance Decisions in the R&D Process: An Integrative Framework Based on TCT and Knowledge View of The Firm.
Andrea Martínez-Noya and Esteban García-Canal
- 346/2007 Diferencias salariales entre empresas públicas y privadas. El caso español
Begoña Cueto y Nuria Sánchez- Sánchez
- 347/2007 Effects of Fiscal Treatments of Second Home Ownership on Renting Supply
Celia Bilbao Terol and Juan Prieto Rodríguez
- 348/2007 Auditors’ ethical dilemmas in the going concern evaluation
Andres Guiral, Waymond Rodgers, Emiliano Ruiz and Jose A. Gonzalo
- 349/2007 Convergencia en capital humano en España. Un análisis regional para el periodo 1970-2004
Susana Morales Sequera y Carmen Pérez Esparrells
- 350/2007 Socially responsible investment: mutual funds portfolio selection using fuzzy multiobjective programming
Blanca M^a Pérez-Gladish, Mar Arenas-Parra , Amelia Bilbao-Terol and M^a Victoria Rodríguez-Uría
- 351/2007 Persistencia del resultado contable y sus componentes: implicaciones de la medida de ajustes por devengo
Raúl Iñiguez Sánchez y Francisco Poveda Fuentes
- 352/2007 Wage Inequality and Globalisation: What can we Learn from the Past? A General Equilibrium Approach
Concha Betrán, Javier Ferri and Maria A. Pons
- 353/2007 Eficacia de los incentivos fiscales a la inversión en I+D en España en los años noventa
Desiderio Romero Jordán y José Félix Sanz Sanz
- 354/2007 Convergencia regional en renta y bienestar en España
Robert Meneu Gaya
- 355/2007 Tributación ambiental: Estado de la Cuestión y Experiencia en España
Ana Carrera Poncela
- 356/2007 Salient features of dependence in daily us stock market indices
Luis A. Gil-Alana, Juncal Cuñado and Fernando Pérez de Gracia
- 357/2007 La educación superior: ¿un gasto o una inversión rentable para el sector público?
Inés P. Murillo y Francisco Pedraja

- 358/2007 Effects of a reduction of working hours on a model with job creation and job destruction
Emilio Domínguez, Miren Ullibarri y Idoya Zabaleta
- 359/2007 Stock split size, signaling and earnings management: Evidence from the Spanish market
José Yagüe, J. Carlos Gómez-Sala and Francisco Poveda-Fuentes
- 360/2007 Modelización de las expectativas y estrategias de inversión en mercados de derivados
Begoña Font-Belaire
- 361/2008 Trade in capital goods during the golden age, 1953-1973
M^a Teresa Sanchis and Antonio Cubel
- 362/2008 El capital económico por riesgo operacional: una aplicación del modelo de distribución de pérdidas
Enrique José Jiménez Rodríguez y José Manuel Fera Domínguez
- 363/2008 The drivers of effectiveness in competition policy
Joan-Ramon Borrell and Juan-Luis Jiménez
- 364/2008 Corporate governance structure and board of directors remuneration policies: evidence from Spain
Carlos Fernández Méndez, Rubén Arrondo García and Enrique Fernández Rodríguez
- 365/2008 Beyond the disciplinary role of governance: how boards and donors add value to Spanish foundations
Pablo De Andrés Alonso, Valentín Azofra Palenzuela y M. Elena Romero Merino
- 366/2008 Complejidad y perfeccionamiento contractual para la contención del oportunismo en los acuerdos de franquicia
Vanessa Solís Rodríguez y Manuel González Díaz
- 367/2008 Inestabilidad y convergencia entre las regiones europeas
Jesús Mur, Fernando López y Ana Angulo
- 368/2008 Análisis espacial del cierre de explotaciones agrarias
Ana Aldanondo Ochoa, Carmen Almansa Sáez y Valero Casanovas Oliva
- 369/2008 Cross-Country Efficiency Comparison between Italian and Spanish Public Universities in the period 2000-2005
Tommaso Agasisti and Carmen Pérez Esparrells
- 370/2008 El desarrollo de la sociedad de la información en España: un análisis por comunidades autónomas
María Concepción García Jiménez y José Luis Gómez Barroso
- 371/2008 El medioambiente y los objetivos de fabricación: un análisis de los modelos estratégicos para su consecución
Lucía Avella Camarero, Esteban Fernández Sánchez y Daniel Vázquez-Bustelo
- 372/2008 Influence of bank concentration and institutions on capital structure: New international evidence
Víctor M. González and Francisco González
- 373/2008 Generalización del concepto de equilibrio en juegos de competición política
M^a Dolores López González y Javier Rodrigo Hitos
- 374/2008 Smooth Transition from Fixed Effects to Mixed Effects Models in Multi-level regression Models
María José Lombardía and Stefan Sperlich

- 375/2008 A Revenue-Neutral Tax Reform to Increase Demand for Public Transport Services
Carlos Pestana Barros and Juan Prieto-Rodríguez
- 376/2008 Measurement of intra-distribution dynamics: An application of different approaches to the European regions
Adolfo Maza, María Hierro and José Villaverde
- 377/2008 Migración interna de extranjeros y ¿nueva fase en la convergencia?
María Hierro y Adolfo Maza
- 378/2008 Efectos de la Reforma del Sector Eléctrico: Modelización Teórica y Experiencia Internacional
Ciro Eduardo Bazán Navarro
- 379/2008 A Non-Parametric Independence Test Using Permutation Entropy
Mariano Matilla-García and Manuel Ruiz Marín
- 380/2008 Testing for the General Fractional Unit Root Hypothesis in the Time Domain
Uwe Hassler, Paulo M.M. Rodrigues and Antonio Rubia
- 381/2008 Multivariate gram-charlier densities
Esther B. Del Brio, Trino-Manuel Níguez and Javier Perote
- 382/2008 Analyzing Semiparametrically the Trends in the Gender Pay Gap - The Example of Spain
Ignacio Moral-Arce, Stefan Sperlich, Ana I. Fernández-Saínz and Maria J. Roca
- 383/2008 A Cost-Benefit Analysis of a Two-Sided Card Market
Santiago Carbó Valverde, David B. Humphrey, José Manuel Liñares Zegarra and Francisco Rodríguez Fernández
- 384/2008 A Fuzzy Bicriteria Approach for Journal Deselection in a Hospital Library
M. L. López-Avello, M. V. Rodríguez-Uría, B. Pérez-Gladish, A. Bilbao-Terol, M. Arenas-Parra
- 385/2008 Valoración de las grandes corporaciones farmacéuticas, a través del análisis de sus principales intangibles, con el método de opciones reales
Gracia Rubio Martín y Prosper Lamothe Fernández
- 386/2008 El marketing interno como impulsor de las habilidades comerciales de las pyme españolas: efectos en los resultados empresariales
M^a Leticia Santos Vijande, M^a José Sanzo Pérez, Nuria García Rodríguez y Juan A. Trespalacios Gutiérrez
- 387/2008 Understanding Warrants Pricing: A case study of the financial market in Spain
David Abad y Belén Nieto
- 388/2008 Aglomeración espacial, Potencial de Mercado y Geografía Económica: Una revisión de la literatura
Jesús López-Rodríguez y J. Andrés Faíña
- 389/2008 An empirical assessment of the impact of switching costs and first mover advantages on firm performance
Jaime Gómez, Juan Pablo Maícas
- 390/2008 Tender offers in Spain: testing the wave
Ana R. Martínez-Cañete y Inés Pérez-Soba Aguilar

- 391/2008 La integración del mercado español a finales del siglo XIX: los precios del trigo entre 1891 y 1905
Mariano Matilla García, Pedro Pérez Pascual y Basilio Sanz Carnero
- 392/2008 Cuando el tamaño importa: estudio sobre la influencia de los sujetos políticos en la balanza de bienes y servicios
Alfonso Echazarra de Gregorio
- 393/2008 Una visión cooperativa de las medidas ante el posible daño ambiental de la desalación
Borja Montaña Sanz
- 394/2008 Efectos externos del endeudamiento sobre la calificación crediticia de las Comunidades Autónomas
Andrés Leal Marcos y Julio López Laborda
- 395/2008 Technical efficiency and productivity changes in Spanish airports: A parametric distance functions approach
Beatriz Tovar & Roberto Rendeiro Martín-Cejas
- 396/2008 Network analysis of exchange data: Interdependence drives crisis contagion
David Matesanz Gómez & Guillermo J. Ortega
- 397/2008 Explaining the performance of Spanish privatised firms: a panel data approach
Laura Cabeza Garcia and Silvia Gomez Anson
- 398/2008 Technological capabilities and the decision to outsource R&D services
Andrea Martínez-Noya and Esteban García-Canal
- 399/2008 Hybrid Risk Adjustment for Pharmaceutical Benefits
Manuel García-Goñi, Pere Ibern & José María Inoriza
- 400/2008 The Team Consensus–Performance Relationship and the Moderating Role of Team Diversity
José Henrique Dieguez, Javier González-Benito and Jesús Galende
- 401/2008 The institutional determinants of CO₂ emissions: A computational modelling approach using Artificial Neural Networks and Genetic Programming
Marcos Álvarez-Díaz , Gonzalo Caballero Miguez and Mario Soliño
- 402/2008 Alternative Approaches to Include Exogenous Variables in DEA Measures: A Comparison Using Monte Carlo
José Manuel Cordero-Ferrera, Francisco Pedraja-Chaparro and Daniel Santín-González
- 403/2008 Efecto diferencial del capital humano en el crecimiento económico andaluz entre 1985 y 2004: comparación con el resto de España
M^a del Pópulo Pablo-Romero Gil-Delgado y M^a de la Palma Gómez-Calero Valdés
- 404/2008 Análisis de fusiones, variaciones conjeturales y la falacia del estimador en diferencias
Juan Luis Jiménez y Jordi Perdiguero
- 405/2008 Política fiscal en la ue: ¿basta con los estabilizadores automáticos?
Jorge Uxó González y M^a Jesús Arroyo Fernández
- 406/2008 Papel de la orientación emprendedora y la orientación al mercado en el éxito de las empresas
Óscar González-Benito, Javier González-Benito y Pablo A. Muñoz-Gallego
- 407/2008 La presión fiscal por impuesto sobre sociedades en la unión europea
Elena Fernández Rodríguez, Antonio Martínez Arias y Santiago Álvarez García

- 408/2008 The environment as a determinant factor of the purchasing and supply strategy: an empirical analysis
Dr. Javier González-Benito y MS Duilio Reis da Rocha
- 409/2008 Cooperation for innovation: the impact on innovatory effort
Gloria Sánchez González and Liliana Herrera
- 410/2008 Spanish post-earnings announcement drift and behavioral finance models
Carlos Forner and Sonia Sanabria
- 411/2008 Decision taking with external pressure: evidence on football manager dismissals in argentina and their consequences
Ramón Flores, David Forrest and Juan de Dios Tena
- 412/2008 Comercio agrario latinoamericano, 1963-2000: aplicación de la ecuación gravitacional para flujos desagregados de comercio
Raúl Serrano y Vicente Pinilla
- 413/2008 Voter heuristics in Spain: a descriptive approach elector decision
José Luís Sáez Lozano and Antonio M. Jaime Castillo
- 414/2008 Análisis del efecto área de salud de residencia sobre la utilización y acceso a los servicios sanitarios en la Comunidad Autónoma Canaria
Ignacio Abásolo Alessón, Lidia García Pérez, Raquel Aguiar Ibáñez y Asier Amador Robayna
- 415/2008 Impact on competitive balance from allowing foreign players in a sports league: an analytical model and an empirical test
Ramón Flores, David Forrest & Juan de Dios Tena
- 416/2008 Organizational innovation and productivity growth: Assessing the impact of outsourcing on firm performance
Alberto López
- 417/2008 Value Efficiency Analysis of Health Systems
Eduardo González, Ana Cárcaba & Juan Ventura
- 418/2008 Equidad en la utilización de servicios sanitarios públicos por comunidades autónomas en España: un análisis multinivel
Ignacio Abásolo, Jaime Pinilla, Miguel Negrín, Raquel Aguiar y Lidia García
- 419/2008 Piedras en el camino hacia Bolonia: efectos de la implantación del EEES sobre los resultados académicos
Carmen Florido, Juan Luis Jiménez e Isabel Santana
- 420/2008 The welfare effects of the allocation of airlines to different terminals
M. Pilar Socorro and Ofelia Betancor
- 421/2008 How bank capital buffers vary across countries. The influence of cost of deposits, market power and bank regulation
Ana Rosa Fonseca and Francisco González
- 422/2008 Analysing health limitations in Spain: an empirical approach based on the European Community household panel
Marta Pascual and David Cantarero

- 423/2008 Regional productivity variation and the impact of public capital stock: an analysis with spatial interaction, with reference to Spain
Miguel Gómez-Antonio and Bernard Fingleton
- 424/2008 Average effect of training programs on the time needed to find a job. The case of the training schools program in the south of Spain (Seville, 1997-1999).
José Manuel Cansino Muñoz-Repiso and Antonio Sánchez Braza
- 425/2008 Medición de la eficiencia y cambio en la productividad de las empresas distribuidoras de electricidad en Perú después de las reformas
Raúl Pérez-Reyes y Beatriz Tovar
- 426/2008 Acercando posturas sobre el descuento ambiental: sondeo Delphi a expertos en el ámbito internacional
Carmen Almansa Sáez y José Miguel Martínez Paz
- 427/2008 Determinants of abnormal liquidity after rating actions in the Corporate Debt Market
Pilar Abad, Antonio Díaz and M. Dolores Robles
- 428/2008 Export led-growth and balance of payments constrained. New formalization applied to Cuban commercial regimes since 1960
David Matesanz Gómez, Guadalupe Fugarolas Álvarez-Ude and Isis Mañalich Gálvez
- 429/2008 La deuda implícita y el desequilibrio financiero-actuarial de un sistema de pensiones. El caso del régimen general de la seguridad social en España
José Enrique Devesa Carpio y Mar Devesa Carpio
- 430/2008 Efectos de la descentralización fiscal sobre el precio de los carburantes en España
Desiderio Romero Jordán, Marta Jorge García-Inés y Santiago Álvarez García
- 431/2008 Euro, firm size and export behavior
Silviano Esteve-Pérez, Salvador Gil-Pareja, Rafael Llorca-Vivero and José Antonio Martínez-Serrano
- 432/2008 Does social spending increase support for free trade in advanced democracies?
Ismael Sanz, Ferran Martínez i Coma and Federico Steinberg
- 433/2008 Potencial de Mercado y Estructura Espacial de Salarios: El Caso de Colombia
Jesús López-Rodríguez y Maria Cecilia Acevedo
- 434/2008 Persistence in Some Energy Futures Markets
Juncal Cunado, Luis A. Gil-Alana and Fernando Pérez de Gracia
- 435/2008 La inserción financiera externa de la economía francesa: inversores institucionales y nueva gestión empresarial
Ignacio Álvarez Peralta
- 436/2008 ¿Flexibilidad o rigidez salarial en España?: un análisis a escala regional
Ignacio Moral Arce y Adolfo Maza Fernández
- 437/2009 Intangible relationship-specific investments and the performance of r&d outsourcing agreements
Andrea Martínez-Noya, Esteban García-Canal & Mauro F. Guillén
- 438/2009 Friendly or Controlling Boards?
Pablo de Andrés Alonso & Juan Antonio Rodríguez Sanz

- 439/2009 La sociedad Trenor y Cía. (1838-1926): un modelo de negocio industrial en la España del siglo XIX
Amparo Ruiz Llopis
- 440/2009 Continental bias in trade
Salvador Gil-Pareja, Rafael Llorca-Vivero & José Antonio Martínez Serrano
- 441/2009 Determining operational capital at risk: an empirical application to the retail banking
Enrique José Jiménez-Rodríguez, José Manuel Fera-Domínguez & José Luis Martín-Marín
- 442/2009 Costes de mitigación y escenarios post-kyoto en España: un análisis de equilibrio general para España
Mikel González Ruiz de Eguino
- 443/2009 Las revistas españolas de economía en las bibliotecas universitarias: ranking, valoración del indicador y del sistema
Valentín Edo Hernández
- 444/2009 Convergencia económica en España y coordinación de políticas económicas. un estudio basado en la estructura productiva de las CC.AA.
Ana Cristina Mingorance Arnáiz
- 445/2009 Instrumentos de mercado para reducir emisiones de co2: un análisis de equilibrio general para España
Mikel González Ruiz de Eguino
- 446/2009 El comercio intra e inter-regional del sector Turismo en España
Carlos Llano y Tamara de la Mata
- 447/2009 Efectos del incremento del precio del petróleo en la economía española: Análisis de cointegración y de la política monetaria mediante reglas de Taylor
Fernando Hernández Martínez
- 448/2009 Bologna Process and Expenditure on Higher Education: A Convergence Analysis of the EU-15
T. Agasisti, C. Pérez Esparrells, G. Catalano & S. Morales
- 449/2009 Global Economy Dynamics? Panel Data Approach to Spillover Effects
Gregory Daco, Fernando Hernández Martínez & Li-Wu Hsu
- 450/2009 Pricing levered warrants with dilution using observable variables
Isabel Abinzano & Javier F. Navas
- 451/2009 Information technologies and financial performance: The effect of technology diffusion among competitors
Lucio Fuentelsaz, Jaime Gómez & Sergio Palomas
- 452/2009 A Detailed Comparison of Value at Risk in International Stock Exchanges
Pilar Abad & Sonia Benito
- 453/2009 Understanding offshoring: has Spain been an offshoring location in the nineties?
Belén González-Díaz & Rosario Gandoy
- 454/2009 Outsourcing decision, product innovation and the spatial dimension: Evidence from the Spanish footwear industry
José Antonio Belso-Martínez

- 455/2009 Does playing several competitions influence a team's league performance? Evidence from Spanish professional football
Andrés J. Picazo-Tadeo & Francisco González-Gómez
- 456/2009 Does accessibility affect retail prices and competition? An empirical application
Juan Luis Jiménez and Jordi Perdiguero
- 457/2009 Cash conversion cycle in smes
Sonia Baños-Caballero, Pedro J. García-Teruel and Pedro Martínez-Solano
- 458/2009 Un estudio sobre el perfil de hogares endeudados y sobreendeudados: el caso de los hogares vascos
Alazne Mujika Alberdi, Iñaki García Arrizabalaga y Juan José Gibaja Martíns
- 459/2009 Imposing monotonicity on outputs in parametric distance function estimations: with an application to the spanish educational production
Sergio Perelman and Daniel Santin
- 460/2009 Key issues when using tax data for concentration analysis: an application to the Spanish wealth tax
José M^a Durán-Cabré and Alejandro Esteller-Moré
- 461/2009 ¿Se está rompiendo el mercado español? Una aplicación del enfoque de feldstein –horioka
Saúl De Vicente Queijeiro, José Luis Pérez Rivero y María Rosalía Vicente Cuervo
- 462/2009 Financial condition, cost efficiency and the quality of local public services
Manuel A. Muñiz & José L. Zafra
- 463/2009 Including non-cognitive outputs in a multidimensional evaluation of education production: an international comparison
Marián García Valiñas & Manuel Antonio Muñiz Pérez
- 464/2009 A political look into budget deficits. The role of minority governments and oppositions
Albert Falcó-Gimeno & Ignacio Jurado
- 465/2009 La simulación del cuadro de mando integral. Una herramienta de aprendizaje en la materia de contabilidad de gestión
Elena Urquía Grande, Clara Isabel Muñoz Colomina y Elisa Isabel Cano Montero
- 466/2009 Análisis histórico de la importancia de la industria de la desalinización en España
Borja Montaña Sanz
- 467/2009 The dynamics of trade and innovation: a joint approach
Silviano Esteve-Pérez & Diego Rodríguez
- 468/2009 Measuring international reference-cycles
Sonia de Lucas Santos, Inmaculada Álvarez Ayuso & M^a Jesús Delgado Rodríguez
- 469/2009 Measuring quality of life in Spanish municipalities
Eduardo González Fidalgo, Ana Cárcaba García, Juan Ventura Victoria & Jesús García García
- 470/2009 ¿Cómo se valoran las acciones españolas: en el mercado de capitales doméstico o en el europeo?
Begoña Font Belaire y Alfredo Juan Grau Grau
- 471/2009 Patterns of e-commerce adoption and intensity. evidence for the european union-27
María Rosalía Vicente & Ana Jesús López

- 472/2009 On measuring the effect of demand uncertainty on costs: an application to port terminals
Ana Rodríguez-Álvarez, Beatriz Tovar & Alan Wall
- 473/2009 Order of market entry, market and technological evolution and firm competitive performance
Jaime Gomez, Gianvito Lanzolla & Juan Pablo Maicas
- 474/2009 La Unión Económica y Monetaria Europea en el proceso exportador de Castilla y León (1993-2007): un análisis de datos de panel
Almudena Martínez Campillo y M^a del Pilar Sierra Fernández
- 475/2009 Do process innovations boost SMEs productivity growth?
Juan A. Mañez, María E. Rochina Barrachina, Amparo Sanchis Llopis & Juan A. Sanchis Llopis
- 476/2009 Incertidumbre externa y elección del modo de entrada en el marco de la inversión directa en el exterior
Cristina López Duarte y Marta M^a Vidal Suárez
- 477/2009 Testing for structural breaks in factor loadings: an application to international business cycle
José Luis Cendejas Bueno, Sonia de Lucas Santos, Inmaculada Álvarez Ayuso & M^a Jesús Delgado Rodríguez
- 478/2009 ¿Esconde la rigidez de precios la existencia de colusión? El caso del mercado de carburantes en las Islas Canarias
Juan Luis Jiménez y Jordi Perdiguero
- 479/2009 The poni test with structural breaks
Antonio Aznar & María-Isabel Ayuda
- 480/2009 Accuracy and reliability of Spanish regional accounts (CRE-95)
Verónica Cañal Fernández
- 481/2009 Estimating regional variations of R&D effects on productivity growth by entropy econometrics
Esteban Fernández-Vázquez y Fernando Rubiera-Morollón
- 482/2009 Why do local governments privatize the provision of water services? Empirical evidence from Spain
Francisco González-Gómez, Andrés J. Picazo-Tadeo & Jorge Guardiola
- 483/2009 Assessing the regional digital divide across the European Union-27
María Rosalía Vicente & Ana Jesús López
- 484/2009 Measuring educational efficiency and its determinants in Spain with parametric distance functions
José Manuel Cordero Ferrera, Eva Crespo Cebada & Daniel Santín González
- 485/2009 Spatial analysis of public employment services in the Spanish provinces
Patricia Suárez Cano & Matías Mayor Fernández
- 486/2009 Trade effects of continental and intercontinental preferential trade agreements
Salvador Gil-Pareja, Rafael Llorca-Vivero & José Antonio Martínez-Serrano
- 487/2009 Testing the accuracy of DEA for measuring efficiency in education under endogeneity
Salvador Gil-Pareja, Rafael Llorca-Vivero & José Antonio Martínez-Serrano
- 488/2009 Measuring efficiency in primary health care: the effect of exogenous variables on results
José Manuel Cordero Ferrera, Eva Crespo Cebada & Luis R. Murillo Zamorano

- 489/2009 Capital structure determinants in growth firms accessing venture funding
Marina Balboa, José Martí & Álvaro Tresierra
- 490/2009 Determinants of debt maturity structure across firm size
Victor M. González
- 491/2009 Análisis del efecto de la aplicación de las NIIF en la valoración de las salidas a bolsa
Susana Álvarez Otero y Eduardo Rodríguez Enríquez
- 492/2009 An analysis of urban size and territorial location effects on employment probabilities: the spanish case
Ana Viñuela-Jiménez, Fernando Rubiera-Morollón & Begoña Cueto
- 493/2010 Determinantes de la estructura de los consejos de administración en España
Isabel Acero Fraile y Nuria Alcalde Fradejas
- 494/2010 Performance and completeness in repeated inter-firm relationships: the case of franchising
Vanessa Solis-Rodriguez & Manuel Gonzalez-Diaz
- 495/2010 A Revenue-Based Frontier Measure of Banking Competition
Santiago Carbó, David Humphrey & Francisco Rodríguez
- 496/2010 Categorical segregation in social networks
Antoni Rubí-Barceló
- 497/2010 Beneficios ambientales no comerciales de la directiva marco del agua en condiciones de escasez: análisis económico para el Guadalquivir
Julia Martin-Ortega, Giacomo Giannoccaro y Julio Berbel Vecino
- 498/2010 Monetary integration and risk diversification in eu-15 sovereign debt markets
Juncal Cuñado & Marta Gómez-Puig
- 499/2010 The Marshall Plan and the Spanish autarky: A welfare loss analysis
José Antonio Carrasco Gallego
- 500/2010 The role of learning in firm R&D persistence
Juan A. Mañez, María E. Rochina-Barrachina, Amparo Sanchis-Llopis & Juan A. Sanchis-Llopis
- 501/2010 Is venture capital more than just money?
Marina Balboa, José Martí & Nina Zieling
- 502/2010 On the effects of supply strategy on business performance: do the relationships among generic competitive objectives matter?
Javier González-Benito
- 503/2010 Corporate cash holding and firm value
Cristina Martínez-Sola, Pedro J. García-Teruel & Pedro Martínez-Solano
- 504/2010 El impuesto de flujos de caja de sociedades: una propuesta de base imponible y su aproximación contable en España
Lourdes Jerez Barroso y Joaquín Teixeira Quirós
- 505/2010 The effect of technological, commercial and human resources on the use of new technology
Jaime Gómez & Pilar Vargas

- 506/2010 ¿Cómo ha afectado la fiscalidad a la rentabilidad de la inversión en vivienda en España?
Un análisis para el periodo 1996 y 2007
Jorge Onrubia Fernández y María del Carmen Rodado Ruiz
- 507/2010 Modelización de flujos en el análisis input-output a partir de la teoría de redes
Ana Salomé García Muñiz
- 508/2010 Export-led-growth hypothesis revisited. a balance of payments approach for Argentina, Brazil, Chile and Mexico
David Matesanz Gómez & Guadalupe Fugarolas Álvarez-Ude
- 509/2010 Realised hedge ratio properties, performance and implications for risk management: evidence from the spanish ibex 35 spot and futures markets
David G McMillan & Raquel Quiroga García
- 510/2010 Do we sack the manager... or is it better not to? Evidence from Spanish professional football
Francisco González-Gómez, Andrés J. Picazo-Tadeo & Miguel Á. García-Rubio
- 511/2010 Have Spanish port sector reforms during the last two decades been successful? A cost frontier approach
Ana Rodríguez-Álvarez & Beatriz Tovar
- 512/2010 Size & Regional Distribution of Financial Behavior Patterns in Spain
Juan Antonio Maroto Acín, Pablo García Estévez & Salvador Roji Ferrari
- 513/2010 The impact of public reforms on the productivity of the Spanish ports: a parametric distance function approach
Ramón Núñez-Sánchez & Pablo Coto-Millán
- 514/2010 Trade policy versus institutional trade barriers: an application using “good old” ols
Laura Márquez-Ramos, Inmaculada Martínez-Zarzoso & Celestino Suárez-Burguet
- 515/2010 The “Double Market” approach in venture capital and private equity activity: the case of Europe
Marina Balboa & José Martí
- 516/2010 International accounting differences and earnings smoothing in the banking industry
Marina Balboa, Germán López-Espinosa & Antonio Rubia
- 517/2010 Convergence in car prices among European countries
Simón Sosvilla-Rivero & Salvador Gil-Pareja
- 518/2010 Effects of process and product-oriented innovations on employee downsizing
José David Vicente-Lorente & José Ángel Zúñiga-Vicente
- 519/2010 Inequality, the politics of redistribution and the tax-mix
Jenny De Freitas
- 520/2010 Efectos del desajuste educativo sobre el rendimiento privado de la educación: un análisis para el caso español (1995-2006)
Inés P. Murillo, Marta Rahona y M^a del Mar Salinas
- 521/2010 Structural breaks and real convergence in opec countries
Juncal Cuñado